

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Savannah River**

Site Summary Level: **Savannah River Site**

Project **SR-SF09 / Spent Nuclear Fuel Treatment and Storage**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0497**

General Project Information

Project Description Narratives

Purpose, Scope, and Technical Approach:

In 1992, the Secretary of Energy directed the Assistant Secretary for Environmental Management (EM) to develop an integrated, long-term Spent Nuclear Fuel (SNF) management program. In response, EM initiated the development of a DOE-owned SNF program to define and ensure resolution of all associated issues starting with the quantification of DOE SNF inventories and fuel storage facilities. The purpose of the DOE-owned SNF program is to integrate DOE's existing SNF activities into one program to better control and manage this material, and to ensure that all issues associated with SNF are resolved in a safe and cost effective manner. The Treatment and Storage Facility (TSF) activities are crucial to the program's overall success.

The Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs final EIS ROD was issued on May 30, 1995. Key impacts from this document include a provision to consolidate aluminum clad SNF at SRS by means of shipping FRR SNF elements, as well as those from US Universities, other DOE sites, and other US Government sites.

In May of 1996 DOE issued the Record of Decision (ROD) on the final Environmental Impact Statement (EIS) on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor SNF. The ROD announced DOE's decision to return aluminum-based foreign research reactor SNF assemblies to the SRS. The ROD states that DOE will pursue technologies that would put the SNF in a form or container that is eligible for direct disposal in a geologic repository. The selection of the SNF Treatment and/or packaging technology, as well as the TSF, is subject to evaluation in accordance with NEPA.

The TSF requires new cask receipt, fuel handling, treatment and dry storage facilities that provide remote handling capabilities, hot cells, heavy lifting capabilities (cask handling) as well as space allowance for movement of bulky items (casks, canisters). The functions are expected to be co-located in the 105-L building and tightly integrated. Based upon available information from the technology development program, a melt and dilute treatment will be deployed to prepare fuel for repository disposal. The FY 1999 CONGRESSIONAL DATA SHEET (10/97) has been prepared assuming treatment will be required, pending results of a SNF EIS ROD (expected mid FY99). The facilities will be designed to have a 40-year life. The TSF is to provide for the receipt and storage of domestic and foreign research reactor SNF assemblies currently in existing wet storage basins or expected to be received at the SRS over the next 40 years.

Facility functions are summarized below:

Receiving/Shipping - Cask receipt (approximately 12/month), cask unloading and cask shipping (loaded and unloaded)
Characterization - SNF inspection for storage, conditioning, and disposition (to meet storage and RW-0333P QA requirements)
Conditioning - Modifying fuel (cropping and fittings and/or cold vacuum drying), as required, to enable treatment.

Treatment - melting and diluting SNF to prepare for repository disposal by reducing uranium concentration to low enrichment levels.
Verification - Provide the capability to perform SNF sampling and analysis. Functions include interim storage safety basis validation, design/operational optimization, prototype testing, irradiated materials testing, and tests to meet final waste form acceptance criteria
Packaging - SNF placement into appropriate canisters, e.g., packaging for pre-treatment interim storage, or transportation off site

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Dry Storage - Provide dry storage of the SNF utilizing modular design and construction

Efforts are underway to determine the actions that will be required to prepare spent nuclear fuels, not scheduled to be processed, for eventual disposal in a geologic repository (see Alternate Technology). The current plan is to prepare these spent nuclear fuels for direct/co-disposal along with high-level waste glass.

Project Status in FY 2006:

The TSF will be in the early phases of a projected 40-year operation. Receipts of Foreign and Domestic Research Reactor, and DOE Aluminum Based Fuel will continue into L-Basin in preparation for transfer to the TSF.

Post-2006 Project Scope:

Foreign Research Reactor Fuel shipments are currently scheduled to be completed during FY 2009. Domestic Research Reactor Fuel shipments will continue beyond FY 2030. Exchanges of aluminum, stainless steel and zirconium fuel to and from Idaho will be ongoing between FY 2010 and FY 2016. These shipments will be received in L-Basin in preparation for transfer to the TSF for conditioning, repackaging and temporary storage.

An end date for shipments to the repository beyond FY 2035, the date cited in the FY96 Baseline Environmental Management Report, has not been identified. The end date for shipping to the repository is contingent on the offsite receipts end date.

Project End State

The facilities associated with this service will be deactivated at the end of its 40-year service. The Department of Energy would be responsible for eventual decommissioning and dismantlement (D&D) of the facility. These activities will not take place, according to the current schedules, until after the year 2032. The final end state has not been established. It can be assumed that the end state will be consistent with the end state selected for the rest of the Savannah River Site currently identified as a Nuclear Industrial Zone and cleanup to industrial standards.

Cost Baseline Comments:

Note: A site critical issue in FY00 is a delta of \$4,337K from the Alternate Technology Target. While the Treatment and Storage Facility may represent a potential funding source, movement of dollars from TSF to Alternate Technology may require some reprogramming action. However, due to the ongoing evaluation of TSF scope, particularly related to potential safety analysis and technical requirements, we will for now preserve these dollars in the TSF estimates. The TSF project is in the pre-conceptual design phase. The financial figures for the Path to Closure (PtC) were derived using the SRS FY99 Annual Operating Plan (AOP) as the beginning basis. Outyear budget (OYB) requirements were estimated by factoring Detailed Information Input Forms (DIIF's) and outyear program planning assumptions/schedules against this AOP baseline. The OYB process utilizes the program requirements contained in the DOE Strategic Execution Guidance (SEG) as the formulation basis of detailed program/operating assumptions and Program Planning Packages used to communicate scope of work requirements to other SRS divisions, e.g. Construction, Waste Management, Environment, Safety & Health, etc. Financial estimates are generated by the line and support organizations using the DIIF system. Estimates were escalated for anticipated inflation using a 3.6% factor for FY00 and 01, and 2.7% for FY02 and beyond - per the guidance from the site.

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Project Description Narratives

The full cost of PBS work scope may change based on the authorized funding and priorities in any given year due to changes in site overhead assumptions. For planning and budgeting purposes, work scope costs were estimated using site overhead rates sized for clearance at a funding target of \$1,222.5 million. For FY2001 (the budget year), the site overhead is applied and cleared at the funding target, while the work scope below the funding target (planning level) is incremental direct cost. For FY2002, the site overhead is applied and cleared over the total planning level of scope.

Safety & Health Hazards:

The Savannah River Site has prepared a Spent Nuclear Fuel Environmental Impact Statement (EIS) to assess the environmental, health, and safety impacts of continued wet storage and TSF. The EIS has been issued for public comment. This process contains a furnace which melts irradiated fuel into a criticality safe storage form. The hazard classification of this facility will be based on the fuel inventory, most likely hazard class 2.

Safety & Health Work Performance:

The current DOE direction is that the TSF will be a LI Project.

The key elements of the WSRC Integrated Safety Program are to define the scope of work, identify and analyze hazards associated with the work, develop and implement hazard controls, perform work within controls, and provide feedback on adequacy of controls and continue to improve safety management. The WSRC Integrated Procedures Management System is the primary mechanism for implementing the objective, principles and functions of the Safety Management System. This system establishes Company-Level, Division-level, and Program-specific procedures consistent with organizational roles, and ensures a consistent, discipline site-wide approach to safety while performing work.

PBS Comments:

In 1992, the Secretary of Energy directed the Assistant Secretary for Environmental Management (EM) to develop an integrated, long-term Spent Nuclear Fuel (SNF) management program. In response, EM initiated the development of a DOE-owned SNF program to define and ensure resolution of all associated issues starting with the quantification of DOE SNF inventories and fuel storage facilities. The purpose of the DOE-owned SNF program is to integrate DOE's existing SNF activities into one program to better control and manage this material, and to ensure that all issues associated with SNF are resolved in a safe and cost effective manner.

The Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel Environmental Impact Statement Record of Decision was issued on May 13, 1996. Key impacts from this document include a provision to return about 17,800 FRR SNF elements to SRS between 1996 and 2009.

The Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs final EIS ROD was issued on May 30, 1995. Key impacts from this document include a provision to consolidate aluminum clad SNF at SRS by means of shipping FRR SNF elements, as well as those from US Universities, other DOE sites, and other US Government sites.

The Transfer and Storage Service activities are crucial to the program's overall success. Availability of the proposed Transfer and Storage Service during FY 2005 is pivotal to achieving efficient and timely deinventory and retirement of L-Basin and RBOF in FY 2010 and FY 2011, respectively.

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Project Description Narratives

Delay would require extending operations in L-Basin and RBOF at approximately \$50 million per year (FY97 dollars), plus costs (approximately \$45K/cask) for double-handling SNF through RBOF or L-Basin and into dry storage.

The current FY99 funding projection reflects the latest planning information. The financial figures in the Congressional Data Sheet, Section 11, shown in A.2.8 below have not been adjusted for the 12/5/97 meeting agreements.

Baseline Validation Narrative:

The design portion of the project was validated by DOE-SR personnel with DOE-HQ participation.

General PBS Information

Project Validated? Yes **Date Validated:** 4/28/1998

Has Headquarters reviewed and approved project? Yes

Date Project was Added: 12/1/1997

Baseline Submission Date: 7/3/1999

FEDPLAN Project? Yes

Drivers:	CERCLA	RCRA	DNFSB	AEA	UMTRCA	State	DOE Orders	Other
	N	N	N	N	N	N	Y	Y

Project Identification Information

DOE Project Manager: Sandra L. Johnson

DOE Project Manager Phone Number: 803-557-3828

DOE Project Manager Fax Number: 803-557-3996

DOE Project Manager e-mail address: sandra-l.johnson@srs.gov

Is this a High Visibility Project (Y/N):

Planning Section

Baseline Costs (in thousands of dollars)

1997-2006 Total	2007-2070 Total	1997-2070 Total	1997	Actual 1997	1998	Actual 1998	1999	2000	2001	2002	2003	2004	2005	2006
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PBS Baseline (current year dollars)	312,397	672,948	985,345	2,578	2,578	939	939	1,461	11,500	13,622	10,391	71,446	84,100	93,604	22,756	
PBS Baseline (constant 1999 dollars)	270,602	370,844	641,446	2,578	2,578	939	939	1,461	11,100	12,692	9,427	63,113	72,338	78,396	18,558	
PBS EM Baseline (current year dollars)	312,397	672,948	985,345	2,578	2,578	939	939	1,461	11,500	13,622	10,391	71,446	84,100	93,604	22,756	
PBS EM Baseline (constant 1999 dollars)	270,602	370,844	641,446	2,578	2,578	939	939	1,461	11,100	12,692	9,427	63,113	72,338	78,396	18,558	
	2007	2008	2009	2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	2051-2055	2056-2060	2061-2065	2066-2070
PBS Baseline (current year dollars)	23,371	24,002	24,650	25,315	137,206	78,378	89,546	102,306	116,883	51,291	0	0	0	0	0	0
PBS Baseline (constant 1999 dollars)	18,558	18,558	18,558	18,558	92,922	46,461	46,461	46,461	46,461	17,846	0	0	0	0	0	0
PBS EM Baseline (current year dollars)	23,371	24,002	24,650	25,315	137,206	78,378	89,546	102,306	116,883	51,291	0	0	0	0	0	0
PBS EM Baseline (constant 1999 dollars)	18,558	18,558	18,558	18,558	92,922	46,461	46,461	46,461	46,461	17,846	0	0	0	0	0	0

Baseline Escalation Rates

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0.00%	0.00%	0.00%	3.60%	3.60%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%
2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	2051-2055	2056-2060	2061-2065	2066-2070
2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%	2.70%

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Project Reconciliation

Project Completion Date Changes:

Previously Projected End Date of Project: 9/1/2035

Current Projected End Date of Project: 9/30/2037

Explanation of Project Completion Date Difference (if applicable):

TSF processing does complete in 2035; the project will then enter into a clean out phase that will complete in 2037. Repository emplacement costs are not included.

Project Cost Estimates (in thousands of dollars)

Previously Estimated Lifecycle Cost (1997 - 2070, 1998 Dollars):	1,003,068	Actual 1997 Cost:	2,578	Actual 1998 Cost:	939
Previously Estimated Lifecycle Cost of Project (1999 - 2070, 1998 Dollars):	999,551	Inflation Adjustment (2.7% to convert 1998 to 1999 dollars):	26,988		
Previously Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	1,026,539				

Project Cost Changes

	Cost Adjustments	Reconciliation Narratives
Cost Change Due to Scope Deletions (-):	388,611	Cost Savings to locate process in existing facility, 105-L.
Cost Reductions Due to Efficiencies (-):		
Cost Associated with New Scope (+):		Scope and cost continue to be refined as technology development and estimate process continue.
Cost Growth Associated with Scope Previously Reported (+):		
Cost Reductions Due to Science & Technology Efficiencies (-):		
Subtotal:	637,928	
Additional Amount to Reconcile (+):	1	
Current Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	637,929	

Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Award Contract	SR-SF09-1		9/1/2000							Y	

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Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Complete Shipments of SS/Zirconium Fuel to INEL (ROD)	SR-SF09-3		9/1/2016								Y
End of Interim SNF Dry Storage, Conditioning, Treatment, Packagin	SR-SF09-5		9/1/2035								
Project Mission Complete	SR-SF09-4		9/1/2035								Y
Start of Interim SNF Dry Storage, Conditioning, Treatment, Packag	SR-SF09-2		8/1/2005								
Project Start	SR-SF09-001		10/1/1996								
TSF Operational	SR-SF09-002		4/30/2005								
TSF Processing completed	SR-SF09-003		9/30/2035								
Project Complete	SR-SF09-004		9/30/2037								

Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Award Contract	SR-SF09-1									Y	
Complete Shipments of SS/Zirconium Fuel to INEL (ROD)	SR-SF09-3									Y	
End of Interim SNF Dry Storage, Conditioning, Treatment, Packagin	SR-SF09-5									Y	
Project Mission Complete	SR-SF09-4									Y	
Start of Interim SNF Dry Storage, Conditioning, Treatment, Packag	SR-SF09-2									Y	
Project Start	SR-SF09-001			Y							TSF has been through several planning cycles. Initially this was to be a "traditional" line item, then TSF was considered to be a candidate for

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Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
TSF Operational	SR-SF09-002		Y				3	3	4		"greenfield" privatization. Under the current proposal, TSF, will be a line item project with the facility being
TSF Processing completed	SR-SF09-003										
Project Complete	SR-SF09-004				Y						TSF and L Area will be in a deactivated state and turned over for deactivation and a final disposition decision.

Performance Measure Metrics

Category/Subcategory	Units	1997-2006 Total	2007-2070 Total	1997-2070 Total	Actual Pre-1997	Planned 1997	Actual 1997	Planned 1998	Planned 1999	Planned 2000	Planned 2001	Planned 2002	Planned 2003	Planned 2004
SNF														
Shipped for Consolidation	MTHM	0.00	20.21	20.22						0.00	0.00	0.00		
Tech.														
Deployed	Ntd	1.00	0.00	1.00										
Category/Subcategory	Units	Planned 2004	Planned 2005	Planned 2006	Planned 2007	Planned 2008	Planned 2009	Planned 2010	Planned 2011 - 2015	Planned 2016 - 2020	Planned 2021 - 2025	Planned 2026 - 2030	Planned 2031 - 2035	Planned 2036 - 2040
SNF														
Shipped for Consolidation	MTHM							2.70	15.44	2.08				
Tech.														
Deployed	Ntd		1.00											

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Category/Subcategory	Units	Planned 2036 - 2040	Planned 2041 - 2045	Planned 2046 - 2050	Planned 2051 - 2055	Planned 2056 - 2060	Planned 2061 - 2035	Planned 2066 - 2070	Exceptions	Lifecycle Total
SNF										
Shipped for Consolidation Tech.	MTHM									20.22
Deployed	Ntd									1.00

Technology Needs

Site Need Code: SR99-6002

Site Need Name: Technology for Repository Storage of Spent Nuclear Fuels

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Both

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

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Technology Needs

Site Need Code: SR99-6003

Site Need Name: Technology for Dry Storage of Spent Nuclear Fuel

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both):

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

Related CCP Milestones

Related Waste Streams

Agree?

Change?

01077: SNF-B - Fuel Group B

Y

N

01080: SNF-E - Fuel Group E, All Targets (cont.)

Y

N

01081: SNF-F - Fuel Group F (cont.)

Y

N

Site Need Code: SR99-6004

Site Need Name: In-Situ U-235 Burn-Up Monitor For Aluminum Clad Spent Nuclear Fuel

Focus Area Work Package ID:

Focus Area Work Package:

Focus Area:

Agree with Technology Link: N

Benefits (Cost, Risk Reduction, Both): Both

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

Related CCP Milestones

Related Waste Streams

Agree?

Change?

01074: SNF-A - Fuel Group A

Y

N

Technology Deployments

Deployment Year

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<u>Deployment Status</u>	<u>Planned</u>	<u>Forecast</u>	<u>Actual Date</u>
Technology Name: SNF Dry Storage Criteria			
Deployment Commitment	2005		